UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/805,304	03/12/2001	Jae Hwan Kim		2103

26387 7590 03/15/2005

ROTH & GOLDMAN, P.A.
523 W. 6TH STREET
SUITE 707
LOS ANGELES, CA 90014

EXAMINER	
GRAHAM, ANDREW R	
ART UNIT	**PAPER NUMBER**
2644	

DATE MAILED: 03/15/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/805,304	KIM, JAE HWAN	
	Examiner	Art Unit	
	Andrew Graham	2644	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 June 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1 and 3-6* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1 and 3-6* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Specification

1. The amendments made to the specification are acknowledged and are sufficient to overcome the previous objections. Accordingly, said objections are hereby withdrawn.

Claim Rejections - 35 USC § 112

2. The amendments made to Claims 2 and 4-6 in light of the previous rejections made in view of 35 U.S.C. 112 are acknowledged and are sufficient to overcome the grounds of said previous rejection. Accordingly said rejections are hereby withdrawn.

Claim Objections

3. Claim 5 is objected to because of the following informality:

- line 8, "or" appears as if it should instead be "for", based on the surrounding context of the word.

Appropriate correction is required.

Claim Rejections - 35 USC § 103

4. **Claims 1 and 4-6** are rejected under 35 U.S.C. 103(a) as being unpatentable over Wu (USPN 5783898) in view of Baz (USPN 5485053).

Wu discloses the use of fully passive, non-complex components to reduce vibrational amplitudes in structures.

Specifically regarding **Claim 1**, Wu teaches:

an improved smart panel (20) for a wide band noise reduction (damping of two or more frequency modes)(col. 3, lines 18-37; col. 5, lines 6-48), comprising:

a board structure (26) for decreasing a noise of an audible frequency band ("acoustic structure", col. 1, lines 54-57; col. 3, lines 31-37; example frequency ranges shown as 20-200 Hz, Figures 7a-7c)

a piezoelectric unit (22) attached to the board structure (26) for decreasing the noise when the same audible frequency as the resonance frequency (natural frequency of the mode of vibration, such as ω_1) of the smart panel is propagated (col. 4, lines 18-37 and 57-64; col. 6, lines 37-50)

wherein said piezoelectric unit includes a plurality of piezoelectric members (22a,22b,22c)(col. 7, lines 10-16)

attached to the back surface (one side of 26, Figure 1; relationship between unit, board, damping layer discussed below with regards to Baz)

and a shunt circuit (32) connected with the piezoelectric members (col. 3, lines 38-46).

However, Wu does not specify:

a sound absorption member attached to one surface of the board structure for decreasing a noise of an intermediate and high frequency portion of the audible frequency band; and

that the piezoelectric unit is attached to the back surface of the board structure to which the sound absorption member is attached

Baz discloses a system that employs both unconstrained and electrically connected, piezoelectric damping layers.

Specifically regarding Claim 1, Baz teaches:

a sound absorption member (10) attached to one surface of the board structure for decreasing a noise of an intermediate and high frequency portion of the audible frequency band (viscoelastic layer dissipates energy over entire vibration cycle, over broad frequency bands, col. 7, lines 13-15 and 44-47; "high and intermediate" frequency ranges are subbands of "broad frequency band", thus member (10) meets limitation of "decreasing a noise of an intermediate and high frequency"; sound and noise may be attenuated, col. 10, lines 7-12 and 25-36) and

that the piezoelectric unit is attached to the back surface of the board structure to which the sound absorption member is attached (Figure 25 illustrates member (10) attached to back surface of board (20) to which piezoelectric sensor (40) is attached; col. 4, lines 54-65).

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to include a passive damping layer to the system of Wu to provide additional damping, including said damping layer being on the opposite side of a vibrating board structure from a piezoelectric sensor, as is disclosed by Baz. The motivation behind such a modification would have been that such multilayer damping would

have provided higher damping ratios over a broad range of temperatures and frequencies.

Regarding **Claim 4**, the shunt circuitry embodiments of Wu include a dissipation element (44) including a resistance and an inductance tuned to the natural frequency of the mode of vibration that is to be damped (col. 3, lines 49-64 and Figure 2). This reads on "said shunt circuit is formed of a resistor and an inductor device and is tuned for electrically resonating an electric impedance of each piezoelectric member".

Regarding **Claim 5**, please refer above to the rejection of the similar limitations of Claim 1, noting that Baz discloses embodiments (Figures 28,30) that comprise a PZT sensors (40) and dampling layers (10) between two flexible plates (21,22) or cylinders (24,25), with at least one damping member being attached to an inner surface of the boards (22) or shells (24)(col. 5, lines 11-15 and 34-45).

Regarding **Claim 6**, Baz discloses an embodiment wherein patches of piezoelectric materials and viscoelastic are sandwiched between two board members (col. 5, lines 17-27; Figure 28). Figure 28 illustrates that an upper viscoelastic layer (10, affixed to 22) is vertically positioned above a space between patches, which is bounded by an inner surface of a lower board structure. The vertical positioning of this spacing reads on "an air layer is formed between the other of the board structures and the sound absorption member".

5. **Claim 3** is rejected under 35 U.S.C. 103(a) as being unpatentable over Wu in view of Bas as applied above, and in further view of Lazarus et al (USPN 6102426). Hereafter, "Lazarus et al" will be referred to as "Lazarus".

Wu discloses the use of fully passive, non-complex components to reduce vibrational amplitudes in structures. Baz discloses a system that employs both unconstrained and electrically connected, piezoelectric damping layers.

Wu teaches that the patches are at locations with at least one mode, which implies that the patches are not at node locations (col. 4, lines 56-57). Baz teaches that patches are placed at optimal locations to control several bending modes of vibrations (col. 5, lines 11-15).

However, Wu in view of Baz does not clearly specify:

said piezoelectric members are attached to an anti-nodal point which generates a maximum displacement of the board structure for maximizing the noise reduction effect

Lazarus discloses the use of passive shunting of an elongated mechanical structure.

Regarding **Claim 3**, Lazarus teaches:

said piezoelectric members are attached to an anti-nodal point which generates a maximum displacement of the board structure for maximizing the noise reduction effect ("regions of high strain", col. 10, lines 15-33).

To one of ordinary skill in the art at the time the invention was made, it would have been obvious to implement the patches of the system of Wu in view of Baz in the locations on the support board that exhibit maximal strain for the relevant vibration modes. The motivation behind such an arrangement would have been that the relative positioning of the passive shunts to the areas of maximum strain would have maximized the mechanical efficiency of the electroactive assemblies.

Response to Arguments

6. Applicant's arguments with respect to claims 1 and 3-6 are have been considered but are rendered partially moot in view of the new ground(s) of rejection. The following responses apply to the arguments presented regarding references that were previously applied and have been maintained in the rejections detailed above.

On page 4, lines 23-24 and page 5, lines 1-2, the applicant has stated, "the visco-elastic material and the constrained layer of the Baz invention do not have their own performing frequency band but perform together in any frequency band. This differs from the present invention in which each element has its own shared frequency band for performance". The examiner respectfully notes that the contended difference is not clearly presented in the currently submitted claim language, which states, "decreasing a noise of an intermediate and high frequency portion of the audible frequency band". As noted by the applicant, the visco-elastic material performs in any or a wide

frequency band. Subbands of a wide frequency band include high and intermediate frequency ranges. Accordingly, as the damping material of Baz dissipates energy over a wide frequency band, it is considered to at least dissipate energy over intermediate and high frequency ranges of said band, thereby meeting the claim limitation cited above.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL.** See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andrew Graham whose telephone number is 703-308-6729. The examiner can normally be reached on Monday-Friday, 8:30 AM to 5:00 PM (EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh Tran can be reached on (703)305-4040. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

SINH TRAN
SUPERVISORY PATENT EXAMINER

AG
Andrew Graham
Examiner
A.U. 2644

ag
February 7, 2005